

Memory Allocations

Replacement for Page K

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A memory allocation diagnostic has been added to the PowerPC-based Linac front ends. It logs memory allocations and releases into a data stream. In the 68K-based IRM front ends, there is a page application called `PAGEMBLK` that is normally installed as Page K. It displays a list of the currently-active memory blocks along with their type and size. This note explores how one might write a replacement for Page K that works with the new diagnostic.

One approach is to monitor the data stream records via a suitable data request. Keep a record of all memory blocks that are allocated but not yet freed. For an allocation record, add it to the pool. For a release record, erase the allocation record in the pool. Update a display that shows all this in order of increasing memory block addresses.

An approach to managing the list in numeric order might be to keep a stable list in one area and a dynamic (rapidly changing) list in another. When a block has matured in the dynamic list, it can be moved to the stable list. Rapid activity might therefore work with a smaller list to reduce the overhead with this management. The display may or may not include the rapidly-changing blocks. It is often the case that a block is reused very often. This is especially true for the nodes that communicate with SRMs.

How long should be the time for maturity before an entry in the dynamic list is placed into the stable list? Consider a half second or even one second.

In node0626, which has 4 SRMs, the entire 4K data stream queue wraps every two seconds, which means that about 120 entries are recorded every second. This is about 8 per 15 Hz cycle. So, monitoring that queue must allow for somewhat more than this to be requested. Eight entries are 128 bytes. Suppose the monitoring asks for 256 bytes at 15 Hz. This would probably be adequate to keep up. A little more wouldn't hurt.

Much of the code can probably be based upon the `PAGEMBLK` application. Updating the list of active requests would be new logic that would replace the linked list scheme that relies on how the underlying OS supports memory allocations.